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NEW ENGLAND NOTE

NOTEWORTHY PLANTS IN CREATED WETLANDS IN SOUTHEASTERN NEW HAMPSHIRE

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During the summer of 2002 a floristic study was conducted of four created wetlands. One site (PORTS) in Portsmouth, New Hampshire, was a 13-acre wetland created in an abandoned gravel pit adjacent to a Conservation Commission protected parcel of land, enhancing its value as a conservation easement (Normandeau Associates 1986; Padgett 1993). Padgett and Crow (Padgett 1993; Padgett and Crow 1994) carried out a floristic inventory of PORTS in 1992 during its 7th growing season, while the 2002 assessment evaluated the floristic changes during the interim 10 years and occurred in the 17th growing season.

The remaining three wetlands were created in Brentwood, New Hampshire as part of a large wetland complex and a multi-year mitigation effort carried out by the New Hampshire Department of Transportation (NHDOT) and implemented by Normandeau Associates, Inc. to replace wetlands lost through the expansion of Route 101 from a two-lane highway to a four-lane divided highway (Garlo et al. 1997). The floristic study of Southern Pond (SOUTH), created in 1995, occurred in its 8th growing season, while the other two wetlands, Northern Pond (NORTH) and Eastern Pond (EAST), created in 1998, were inventoried in their 5th growing season.

The procedures involved in the wetland creation may explain the presence of the rare species. All four created wetlands received transplanted muck soils from the impacted wetlands, containing seeds and vegetative propagules, as a top dressing and to aid in revegetation (Garlo 1992; Garlo et al. 1997; Normandeau Associates 1986). The muck soils may have contained seeds or propagules occurring in the impacted wetlands. Extensive plantings and wetland and upland seed mixes were procured for revegetation at NORTH, SOUTH, and EAST (Garlo et al. 1997; Normandeau Associates 1996, 1997). Unfortuately, the geographical origins of the seed mixes and plantings for the Brentwood wetlands remain unknown. Native shrubs from a preselected list of

species were also planted at PORTS, and the mitigation plan allowed for subsequent plantings from the list in the event of slow revegetation (Normandeau Associates 1986; Padgett 1993; Padgett and Crow 1994). However, records of the origin of these plantings and list of plants that were planted were not required under the mitigation plan and therefore were not kept. It is therefore recommended that careful records of seed and planting purchases be kept and that plant materials be purchased from nurseries within the region offering native species.

NEW STATE RECORD

Carex atherodes Spreng. (Wheat Sedge), found in PORTS, represents the first record of this species for New Hampshire. Despite a circumboreal global range (Dibble 2001), it is considered regionally rare in New England (Brumback and Mehrhoff, et al. 1996). Only two other extant populations of *C. atherodes* are known in New England, one in northwestern Vermont and one in coastal Maine (Dibble 2001), with other historical populations documented earlier than 1970 (Brumback and Mehrhoff, et al. 1996). Several sources refer to *C. atherodes* as typical of the flora of prairie wetlands and sedge meadows of the Midwest (Kirby et al. 1989; Van der Valk et al. 1999; Welling et al. 1988); it is a species often used as hay or forage (Kirby et al. 1989).

Carex atherodes was found on the southwestern side of the created wetland near the upland-wetland border. The plant was found growing in damp to wet soil of the *Juncus effuses–Phalaris arundinacea* cover-type vegetation, as recognized by Padgett and Crow (1994; Padgett 1993). Dibble (2001) noted the habitat for *C. atherodes* as being varied, including marshes exhibiting a stable hydrology, and stated that it is often associated with *P. arundinacea* L., as was the case at PORTS.

SPECIMEN CITATION: U.S.A. New Hampshire: Rockingham Co., Portsmouth, Route 1, created wetland, 12 Jun 2002, *K.J. Jahr 238* (NHA).

RARE SPECIES

The current *Plant Tracking List* of the New Hampshire Natural Heritage Bureau (2003) was used to determine whether any catalogued species in the created wetlands had special status in the state. *Flora Conservanda*, the list compiled by New England Plant Conservation Program (NEPCoP), was also consulted to assess each species' prevalence in the New England area as a whole (Brumback and Mehrhoff, et al. 1996).

Four species found in the study areas were listed as "endangered" for the state by the New Hampshire Natural Heritage Bureau (2003).

Glyceria acutiflora Torr. (Manna Grass) occurred in SOUTH with scattered abundance. Populations were growing in shallow water on the north and northwestern shores of the wetland.

SPECIMEN CITATION: U.S.A. New Hampshire: Rockingham Co., Brentwood, Pine Road, Southern Pond, 17 Jun 2002, *K.J. Jahr 301* (NHA).

Lindernia anagallidea (Michx.) Pennell (False Pimpernel) occurred in NORTH, SOUTH, and EAST, inhabiting mudflats exposed by receding water. Populations were common in NORTH and EAST, while occurring occasionally in SOUTH.

SPECIMEN CITATIONS: U.S.A. New Hampshire: Rockingham Co., Brentwood, Pine Road, Northern Pond, 27 Aug 2002, *K.J. Jahr 896* (NHA); Southern Pond, 26 Aug 2002, *K.J. Jahr 874* (NHA); Eastern Pond, 2 Aug 2002, *K.J. Jahr 751* (NHA).

Potamogeton foliosus Raf. (Leafy Pondweed) occurred in two sites, SOUTH and the larger depression of EAST. Populations in SOUTH were uncommon, only growing in shallow water at the northern end of the wetland. However, *P. foliosus* occurred as scattered masses just off the northern shore of the island in EAST. *Potamogeton foliosus* was reported as "frequent" abundance at PORTS by Padgett and Crow (1994), but was absent in the 2002 PORTS assessment.

SPECIMEN CITATIONS: U.S.A. New Hampshire: Rockingham Co., Brentwood, Pine Road, Southern Pond, 19 Jul 2002, *K.J. Jahr 686* (NHA); Eastern Pond, 15 Jul 2002, *K.J. Jahr 585* (NHA); Portsmouth, Route 1, created wetland, 1992, *D.J. Padgett 164* (NHA).

Rumex pallidus Bigelow (White Dock) was found at PORTS. The plant was uncommon and grew within the emergent zone along the wetland's southern side.

SPECIMEN CITATION: U.S.A. New Hampshire: Rockingham Co., Portsmouth, Route 1, created wetland, 3 Jun 2002, *K.J. Jahr 131* (NHA).

Two species encountered, *Epilobium ciliatum* Raf. subsp. *ciliatum* and *Sparganium eurycarpum* Engelm., have "threatened" status in the state of New Hampshire (New Hampshire Natural Heritage Bureau 2003).

Epilobium ciliatum subsp. *ciliatum* (American Willow-herb) occurred in PORTS, NORTH and EAST. Uncommon at PORTS, this species inhabited the wet meadow edge of upland islands. Occasional in abundance in one pond of NORTH, *E. ciliatum* subsp. *ciliatum* grew on wet sandy shores and wet soils just inland from the open water. The

populations in EAST were scattered and mainly in wet areas and muddy depressions where water had receded.

SPECIMEN CITATIONS: U.S.A. New Hampshire: Rockingham Co., Brentwood, Pine Road, Northern Pond, 1 Jul 2002, *K.J. Jahr 393* (NHA); Eastern Pond, 26 Jun 2002, *K.J. Jahr 346* (NHA).

Sparganium eurycarpum (Burreed) occurred only in the PORTS flora, and was reported by Padgett and Crow (1994). This rare species was reported as "common" and "frequent along the western edge of the wetland" by Padgett and Crow (1994), but was abundant and found growing in emergent zones, shallow depressions, and shallow canals throughout the wetland in 2002. *Sparganium eurycarpum* propagules or fruits may have been in the muck soils transplanted from the impacted wetlands, or may have been planted. Although it is native to the seacoast area, it was included on a list of potential plantings to be made at PORTS if the revegetation had not progressed satisfactorily during the first growing season (Normandeau Associates 1986), and therefore may have been planted early in the wetland's establishment. Monitoring reports were not required for the mitigation at PORTS, so detailed records of subsequent plantings do not exist, making determination of the origin of the rare plant material difficult.

SPECIMEN CITATIONS: U.S.A. New Hampshire: Rockingham Co., Portsmouth, Route 1, created wetland, 25 Jun 2002, *K.J. Jahr 331* (NHA), *D.J. Padgett 53, 81* (NHA).

Two species, *Isoetes engelmannii* A. Braun (Quillwort) and *Potamogeton nodosus* Poir. (Narrowleaf Pondweed), were included on the state tracking list, but had no current status indication.

Isoetes engelmannii was uncommon in NORTH and EAST, but scattered in SOUTH. It was typically found in shallow waters with sandy substrate bottoms in all three wetlands.

SPECIMEN CITATIONS: U.S.A. New Hampshire: Rockingham Co., Brentwood, Pine Road, Northern Pond, 12 Jul 2002, *K.J. Jahr 527* (NHA); Southern Pond, 10 Jul 2002, *K.J. Jahr 474* (NHA); Eastern Pond, 15 Jul 2002, *K.J. Jahr 595* (NHA).

Potamogeton nodosus was commonly growing in shallow water throughout SOUTH, especially in the southern section of the wetland. *Potamogeton nodosus* was reported to have been planted as over-wintering buds throughout aquatic zones in SOUTH, NORTH, and EAST (Normandeau Associates 1997), although it apparently became established only in SOUTH.

SPECIMEN CITATION: U.S.A. New Hampshire: Rockingham Co., Brentwood, Pine Road, Southern Pond, 10 Jul 2002, *K.J. Jahr 486* (NHA).

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